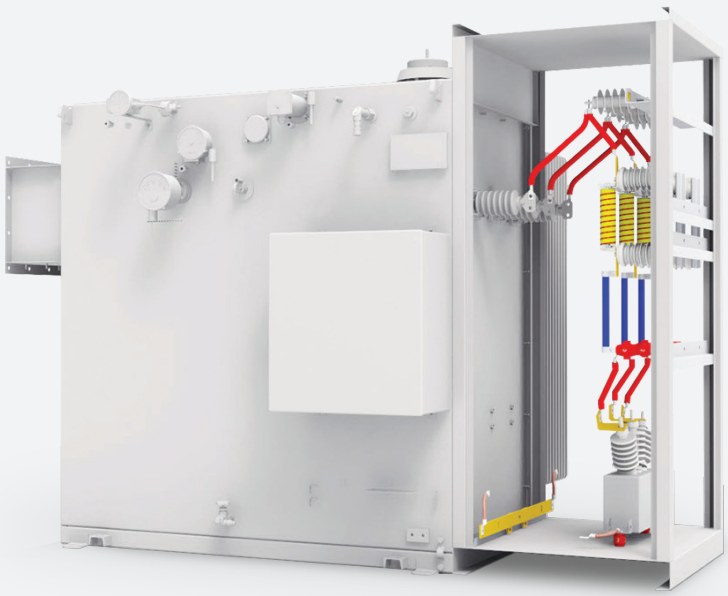
MV Transformer Protection
Electrical Snubber Circuits



ABB's full line of electrical snubber circuits provide the right transformer protection from high frequency transient voltages.

Features and benefits

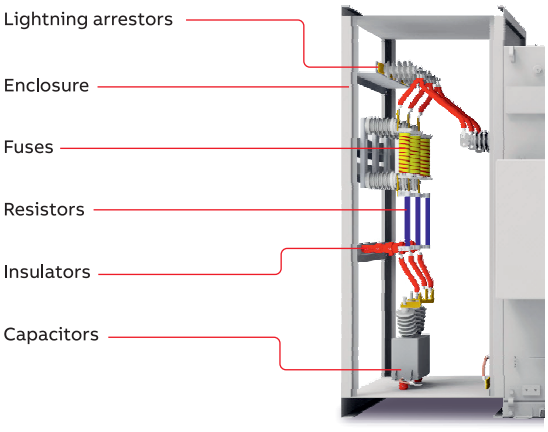
ABB's snubber circuits are custom built to meet customer requirements and are offered for both Liquid and Dry-Type medium voltage transformers.

Key critical power applications demand protection from switching induced transients. Snubber circuits mitigate high frequency transient voltages and the collateral damage they have on equipment.

Design features

Voltage class	Up to 34.5kV (150kV BIL)
Frequency	60Hz (50/60Hz optional)
Fuse	6A full range current limiting fuse
Resistor	20 - 500 ohm ratings
	300 -750 watt ratings
Capacitor	0.083uF - 0.750uF surge capacitors, Single phase - standard Three phase - optional
Arrestors	Distribution, intermediate and station class lightning arrestors
Enclosure type	NEMA Type 1 with standard base
Mounting	Floor mounted, stand-alone, in-line retrofit (dry & liquid), top hats
Optional features and accessories	Snubber monitoring circuits
	Voltage indicators / glow tubes
	304 and 316L stainless steel enclosures
	Custom enclosure finishes and viewing windows
	System analysis for component selection

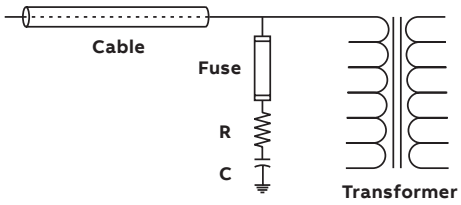
A snubber circuit consists of resistors, capacitors, fuses, lightning surge arrestors, and optional control monitoring circuits. These components when properly designed and configured provide a pathway for transient recovery voltage to enter ground and dissipate that voltage so breaker reignition is reduced, protecting the transformer from the harmful effects of switching transients. Other components may include connection bus, potential and current transformers, indication lights, and control cabinets.



Component features

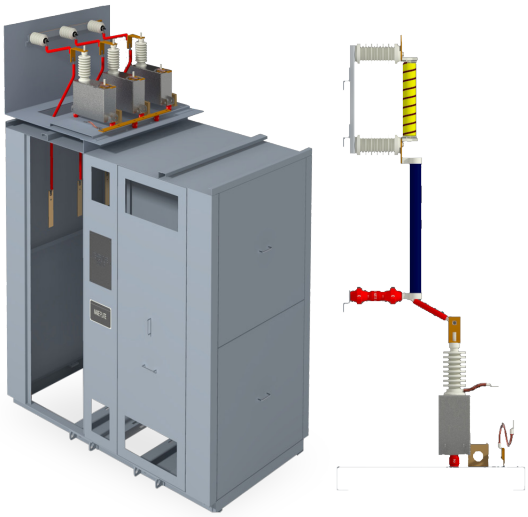
Capacitor	Stores/absorbs energy and designed to modify the steep fronted waves, preventing damage in transformers. Inside each capacitor, are two metal plates separated by a non-conducting substance or dielectric (oil).
Resistor	Regulates and slows down the electric current in a circuit. Also, reduces ringing in a circuit.
Fuses	A component that breaks down the circuit when excessive electric current is introduced
Surge arresters	A device that has a high voltage terminal and a ground terminal. Once an over-voltage transient in current occurs the energy is diverted through the arrester to ground to avoid damaging the system or connected equipment.
Visual monitoring Circuit	Used to determine the wellness of the snubber in the event the capacitors begin to fail. This can be indicated by an increase in capacitance/leakage current and ultimately a fuse (if present) will blow and disconnect the snubber. By monitoring the current, changes can be detected and suitable alarms activated.

ABB has the in-house expertise to assist in sizing snubber components and ratings based on upstream system impedance, available short circuit current and transformer BIL ratings. In addition, ABB can perform snubber study analysis for the transformer in a substation application.



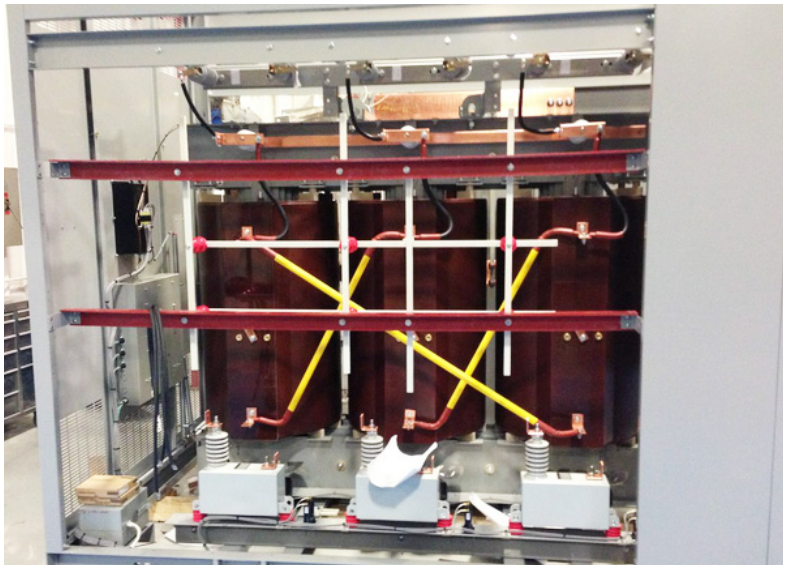
Snubbers can be mounted in various locations including:

- Floor mounted
- Open style
- Inline retrofit (dry & liquid)
- Top mounted / Top hat
- Dedicated Air Terminal Chambers (ATCs)



Benefits

- Integrated solution with transformer
- Retrofitable and easy to install/assemble
- Protects transformer primary windings
- Protection against inter-turn insulation failures
- Reduce the likelihood of VCB pre-strikes, re-strikes, and re-ignitions
- Reduced magnitude and rate-of-rise of voltage transients
- Dampen resonant transients
- Reduced production downtime
- Assists to extend the transformers life



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